

U.S.S.N. 09/634,556

REMARKS

Thorough examination and careful review of the application by the Examiner is noted and appreciated.

Claims 1-16 are pending in the application. Claims 1-16 stand rejected.

Claims 17-24 have been cancelled and withdrawn from further consideration by the Examiner.

Claim Rejections Under 35 USC §103

Claims 1-16 are rejected under 35 USC §103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Chang et al '697 and Estes et al '208.

The rejection of claims 1-16 under 35 USC §103(a) based on AAPA, Chang et al and Estes et al is respectfully traversed.

In the rejection, the Examiner concluded that it would have been obvious to one skilled in the art to modify the process of AAPA by choosing the annealing temperature as taught by Chang et al and using stencil-printing techniques taught by Estes et al to

U.S.S.N. 09/634,556

form and cure the plurality of bumps for forming electrically conductive bumps as claimed with low cost and better control and precision.

The Applicants respectfully submit that while the Examiner attempted to combine the Chang et al and Estes et al references with AAPA, the Applicants respectfully submit that there can be no motivation for such combination for several reasons. First, the Applicants fail to find any suggestion in either reference as to the desirability of such modification. In re Brouwer, 37 USPQ 2d 1663 (Fed. Cir. 1996). Without such suggestions made in any of the references, the basis for the selection of the references and the purported modification must undoubtedly be hindsight drawn from Applicants' disclosure. In re Oetiker, 24 USPQ 2d 1443 (Fed. Cir. 1992). In the present case, AAPA does not contain any teaching or suggestion that non-conductive, polymeric bumps formed by coating/photolithography processes can not be adequately used in a subsequent metal layer coating process in forming conductive bumps and thus, the desirability of a printing process to form the bumps. As a matter of fact, the specification pointed out that the printing technique for producing bumps is

U.S.S.N. 09/634,556

inferior to the coating/photolithography technique in one aspect, as clearly stated in the specification at page 19, line 7-11:

"The disadvantage of the printing method is that the pitch distance between the bumps 60 is limited to a minimum of about 100 μm . This is compared to a smaller pitch distance of about 10 μm achievable by the thin film method of photolithography."

The Applicants therefore respectfully submit that the AAPA would actually teach away from the present invention printing technique.

Secondly, both the Chang et al and the Estes et al references disclose techniques utilized in flip-chip technology (Abstract of Estes et al) or a semiconductor substrate to which an integrated circuit element is connected (Chang et al, col. 2, lines 5-8). To the contrary, AAPA is concerned with a wafer level processing technique. For instance, claim 1 recites "a method for forming electrically conductive bumps on a wafer comprising the steps of". Since Chang et al and Estes et al teach a completely different art area of flip-chip technology, when compared to the wafer level processing technology of AAPA, one skilled in the art

U.S.S.N. 09/634,556

would not have any motivation to combine the references in arriving at the present invention method for printing non-conductive bumps on a wafer.

Thirdly, Estes et al teaches the forming of electrically conductive polymeric bumps by stencil printing on flip-chips, contrary to the AAPA method of forming electrically non-conductive polymeric bumps, there can be no motivation to combine the Estes et al reference with AAPA to arrive at the present invention method of forming electrically non-conductive polymeric bumps by a stencil printing method. In other words, AAPA teaches a two-step forming process of bumps in order to make them electrically conductive, while Estes et al teaches a single-step forming process of electrically conductive bumps.

It is well settled in patent law that the legal guidelines for evaluating obviousness in the examining process are set forth in Graham v John Deere, see MPEP Section 706.02(j) and Section 2141-2144.09. The MPEP Section 706.02(j) cites three basic criteria in establishing a prima facie case of obviousness, i.e. (1) there must be some suggestion or motivation, in the references or in knowledge generally available in the art, to modify a

U.S.S.N. 09/634,556

reference or combine reference teachings, (2) there must be a reasonable expectation of success in so doing, and (3) the combined prior art must teach or suggest all the claim limitations. It further states that "the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure". Accordingly, if the individual references do not contain pertinent teachings, as presented above, it is not seen how their combination can teach or suggest the invention and render the limitation obvious. The Applicants therefore respectfully submit that the Examiner has not carried the burden of setting forth, prima facie, sound reasons why the Applicants should not be granted a patent containing the claims to their invention. In re Grabiak, 226 USPQ 870, 873 (Fed.Cir. 1985).

In summary, the Applicants' invention as presently defined in the claims, differs from and is beyond the level of one skilled in the art at the time the invention was made. That level is represented by the cited prior art of Chang et al and Estes et al which lacks any pertinent teaching or suggestion of the limitations of the invention, so that the claims containing those limitations pass muster for non-obviousness under the three pronged

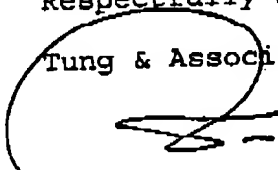
U.S.S.N. 09/634,556

GRAHAM test therefor. Thus, the obviousness rejection under 35 USC §103(a) is not legally sustainable, such that the Applicants' invention as defined in independent claims 1-16, and is patentably distinguishable over the prior art of AAPA, Chang et al and Estes et al. A prompt reconsideration of and the withdrawal of the rejection and passage to issuance of the present application is respectfully requested.

Based on the foregoing, the Applicants respectfully submit that all of the pending claims, i.e. claims 1-16, are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited. In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

Tung & Associates



Randy W. Tung
Reg. No. 31,311
Telephone: (248) 540-4040